North Williston Bridge
Spanning the Winooski River at
the Town Line of Essex and
Williston on Town Highway 1,
southwest of the intersection of
Town Highway 1 and Vermont Route 17
Essex
Chittenden County
Vermont

HAER No. VT-22

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
MID-ATLANTIC REGION, NATIONAL PARK SERVICE
DEPARTMENT OF THE INTERIOR
PHILADELPHIA, PENNSYLVANIA 19106

HAER VT 4-ESX 1-

HISTORIC AMERICAN ENGINEERING RECORD

NORTH WILLISTON BRIDGE

HAER No. VT-22

Location: Spanning the Winooski River at the Town Line of Essex and Williston on Town Highway 1, southwest of the intersection of Town Highway 1 and Vermont Route 117
Towns of Essex and Williston
Chittenden County
Vermont

USGS Essex Junction Quadrangle, Universal Transverse Mercator Coordinates 18.655555.4925820

Date of Construction: 1925

Engineer: Standard Engineering and Contracting Company, Toledo, Ohio

Present Owner: Towns of Essex and Williston
Essex Junction, Vermont
Williston, Vermont

Present Use: Vehicular Bridge

Significance: This bridge is notable as one of the few Pennsylvania trusses in Vermont. The Pennsylvania truss is basically a Parker truss with subdivided panels, permitting additional floor beams between major verticals and thereby a cheaper floor and truss system. Accordingly, its use was generally limited to spans of more than 200' length. The extensive use of members built up by riveting plates, channels, angles and lacing bar is typical of the early 1920s. Later on, such members were more often simply rolled I-beams, a cheaper and faster alternative. This is the only known surviving bridge in Vermont fabricated by the Standard Engineering and Contracting Company. It is eligible for inclusion in the National Register of Historic Places.

Project Information: This documentation was undertaken in January 1991 in accordance with a Memorandum of Agreement signed by the Federal Highway Administration (FHWA), the Vermont State Historic Preservation Office (SHPO), and the Advisory Council on Historic Preservation (ACHP). The Memorandum of Agreement has been accepted by the ACHP as a mitigative measure prior to the replacement of the bridge.

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1. Site Features and Historical Background

This bridge is located over the Winooski River connecting the Towns of Essex and Williston. The Winooski River forms the boundary between the Towns of Essex and Williston. The Winooski River originates in the northeast part of Vermont and is joined by its many tributaries on its way down south and then northwest to Lake Champlain. Lake Champlain in turn empties into the St. Lawrence River which flows east into the Atlantic Ocean. (Ref. 1)

The Town of Essex is located in the northwest part of Vermont with an area of approximately 24,500 acres. The northern and eastern portions of the town are hilly though not mountainous. The southern, central and western parts are more level and sometime swampy. The Winooski River forms the southern boundary of the Town of Essex. (Ref. 2, 3)

The Town of Essex was an area of approximately 23,000 acres charted by Governor Wentworth of New Hampshire in 1763. It was supposedly named after the Earl of Essex. The Town of Essex was important due to its location on the through highway for Indians travelling between Lake Champlain and Connecticut River. The Indians used this town as a campground and many flints and pottery have been unearthed in this area. The first permanent settlement in the town began in 1783. The first settlement tool place on the banks of Winooski. Majority of the settlers came from Connecticut. (Ref. 4, 5)

The Town of Essex held its first organizational meeting in 1786. At that time there were only 72 people living in the town. Now the population is more than 14,000. The first meeting house was built in 1803. The Town of Essex had extensive water power which was utilized in mills. In addition to the mills, there were also a number of dams built in the town. In 1830, a number of mills were destroyed by a flood. (Ref. 2)

The main village in the Town of Essex - Essex Junction was once a major railroad center. It attracted business men and wealth from outside the town and stimulated the employment of capital and labor in developing the resources of its abundant water power as well as improving business in all directions. The Town of Essex is more noted for its agricultural rather than manufacturing or mechanical industries. The soil in the area was rich and exceedingly productive. (Ref. 2, 5)

The Town of Williston is located near the south end of the Town of Essex, with an area of approximately 19,500 acres. The town is bounded on the north by the Winooski River. On the west it is bounded by Muddy Brook. The town of Williston for most part is level land. The types of soil in the area varied from a soft organic to a stiff clay. The land was well drained by streams flowing into Winooski. (Ref. 2, 3, 5)

The Town of Williston was charted by Governor Wentworth of New Hampshire to Samuel Willis and sixty four other associates in 1763. The town was named Williston after Samuel Willis. The legal proprietorship of Williston was questioned in 1764 by New York State. At that time, the Connecticut River was established as a boundary between New York and New Hampshire and the grantees of Williston were asked to repurchase their land from New York State. The first settlers came to the Town of Williston in 1774. In 1790, the Town of Williston was bought from New York by Vermont for $30,000 as part of the land between Lake Champlain and Connecticut River. (Ref. 2)

The first town meeting was held in 1786. There were many taverns in the Town of Williston due to its geographical location on the old turnpike road as the center of many stage lines. There were also a number of distilleries in the Town. In 1860, the first covered bridge over the Winooski River was built in Williston. (Ref. 2)

Unlike the Town of Essex, the Town of Williston did not have the advantage of extensive water power. Hence there were not many mills nor manufacturing industries in the Town of Williston. The soil was productive everywhere in the Town of Williston and the Town was inhabited by some of the wealthiest and most successful farmers in the State. The advent of railroad in 1849 brought in a few new industries. The goods from the industries were shipped out by the railroad to big cities in the east. The arrival of railroad made farming less diversified and dairying became the principal farming industry. (Ref. 2)

2. Bridge Description

The North Williston bridge is a single span steel Pennsylvania through truss with curved top chords. The 289 foot span consists of fourteen 20'-8" panels. Each panel is detailed as follows:

The segmental top chord is made of box girder with lacing at bottom and an overall dimension of 18" x 14". It has been altered by the welding of new plates in the webs of the channels. The bottom chord consists of two sets of paired angles with stay plates across the top. The hip vertical and the sub-diagonals are made of paired angles with stay plates. The major diagonals consist of two sets of back-to-back angles with stay plates. The major verticals are made of back-to-back channels with lacings on both sides. The sub-verticals are paired angles with lacing on one side. The struts are paired angles with lacing. The top lateral bracing consists of crossed angles at each panel. The portal strut and sway bracing are angles in lattice pattern. The end panels are inclined. All connections are riveted. (Ref. 6)

The 19' wide bridge has rolled I-section floor beams and stringers. It has a concrete slab deck on steel grating. The abutments are made of poured concrete. The bridge rails are flat bars in crossing pattern with riveted angles at top and bottom. (Ref. 6)

The bridge had a number of repairs done to it since its construction in 1925. The webs of the channels on the top chord had plates welded to them. In 1984, the bridge was posted for 12 tons due to its structural inadequacy. The bridge suffers from heavy rust and section loss all over. In 1988, grooves were cut on the bridge deck to solve its expansion problems. In 1989, the bridge was made one-way with a stop sign at either end to control the traffic and it was posted for 3 tons. In 1990, the Towns of Essex and Williston closed the bridge for all traffic. (Ref. 7)

3. Construction

The North Williston bridge was built in 1925. It was built before the great flood which affected the whole of Vermont State in 1927. The Town of Essex was not hit hard by the flood. Its bridges including the Essex-Williston bridge and dams were relatively new and stable. (Ref. 4)

The North Williston bridge was constructed by the Standard Engineering and Contracting Company. This Company was from Toledo, Ohio and it lasted for twenty years after its incorporation in 1918. Standard Company apparently made limited sales in the eastern states. The North Williston bridge is the only known surviving bridge in Vermont fabricated by this Company. (Ref. 6, 8)

4. Design and Technology

This bridge is an illustration of the standard but not standardized construction practice in the early 1920s. The built-up members of the bridge with the use of channel sections for the top chords reflect the effort to keep pace with greater traffic and heavier vehicles in the 20th century. The extensive use of members built up by riveting plates, channels, angles, and lacing bars is typical of the early 1920s. Later on, the members were more often rolled I-beams. (Ref. 6, 8)

In the beginning of the 20th century, the steel rivet connected truss bridges were almost standard. The Pennsylvania truss as in the North Williston bridge is basically a Parker truss with subdivided panels permitting additional floor beams between major verticals and thereby a cheaper floor and truss system. (Ref. 6, 8)

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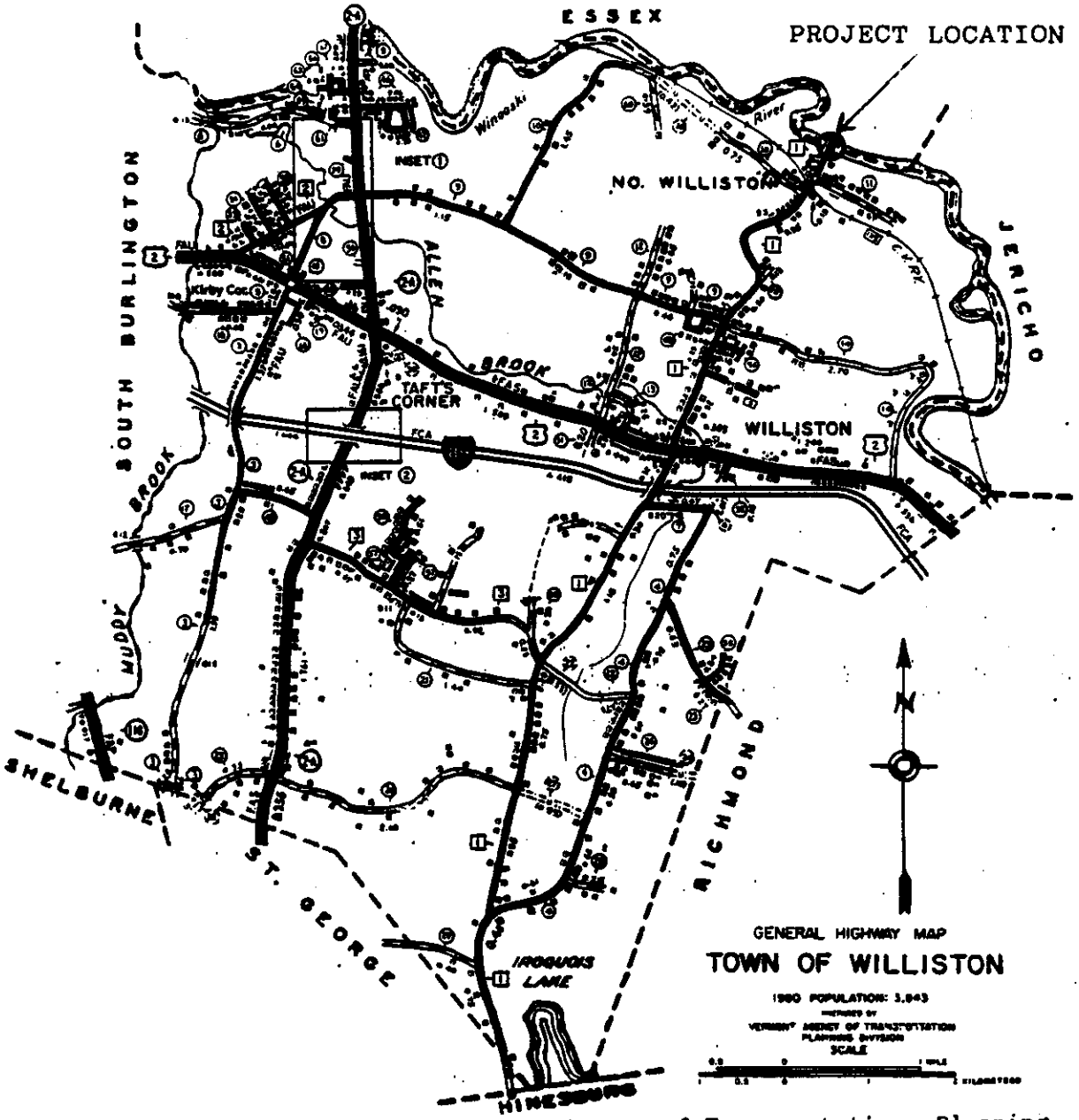

Source: General Highway Map, Vermont Agency of Transportation, Planning Division, 1986.